

1 minus sum minus

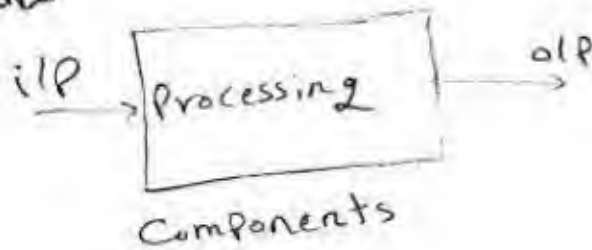
* Signals & Systems:-

Signal \Rightarrow Physical Quantity $[f(t)]$

Classification

\rightarrow Analog vs Digital
 \rightarrow Deterministic vs Random

~~Block~~



System Classification

\rightarrow static & Dynamic -
 \rightarrow Linear & NonLinear .
 \rightarrow Time variance & Time Invariance.

* LTI sys:- Linear time-Invariance system.

diff. eqns $\xrightarrow[\text{it}]{\text{Laplace make}}$ Algebraic eqns.



EX

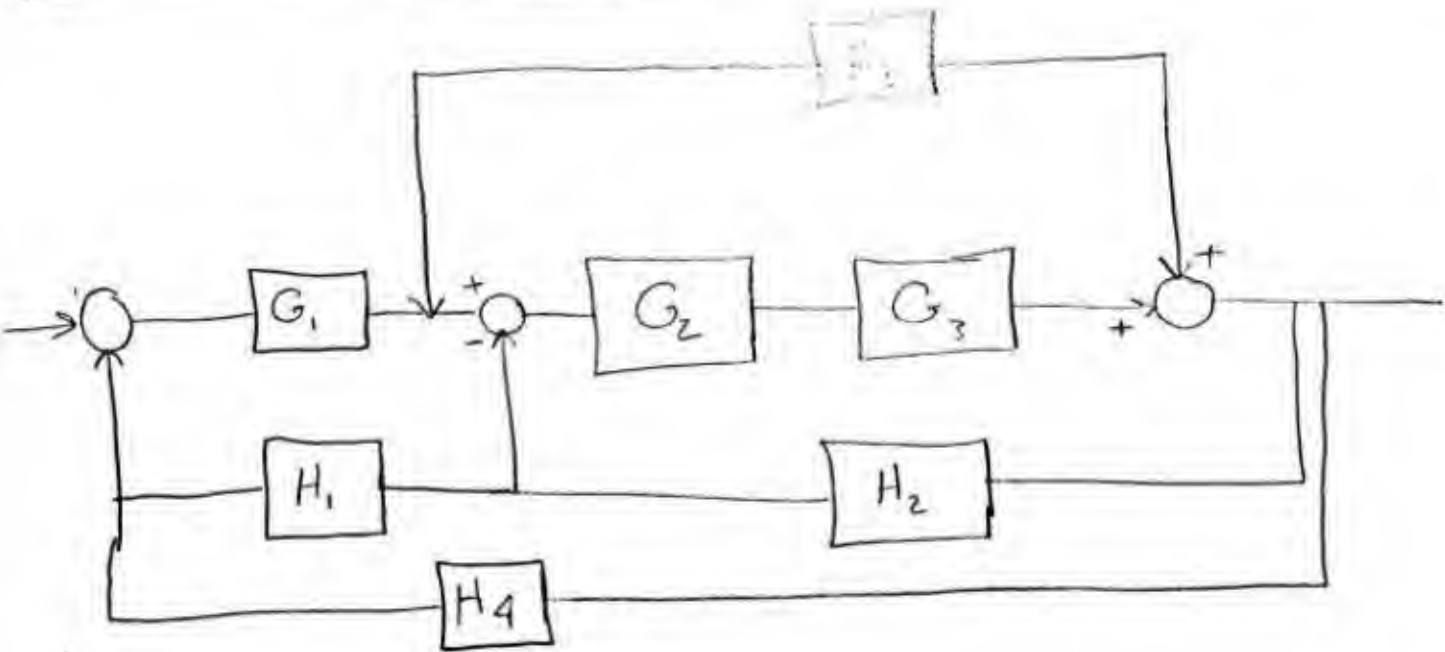
$$C \frac{dV_o}{dt} = \frac{V_i - V_o}{R}$$

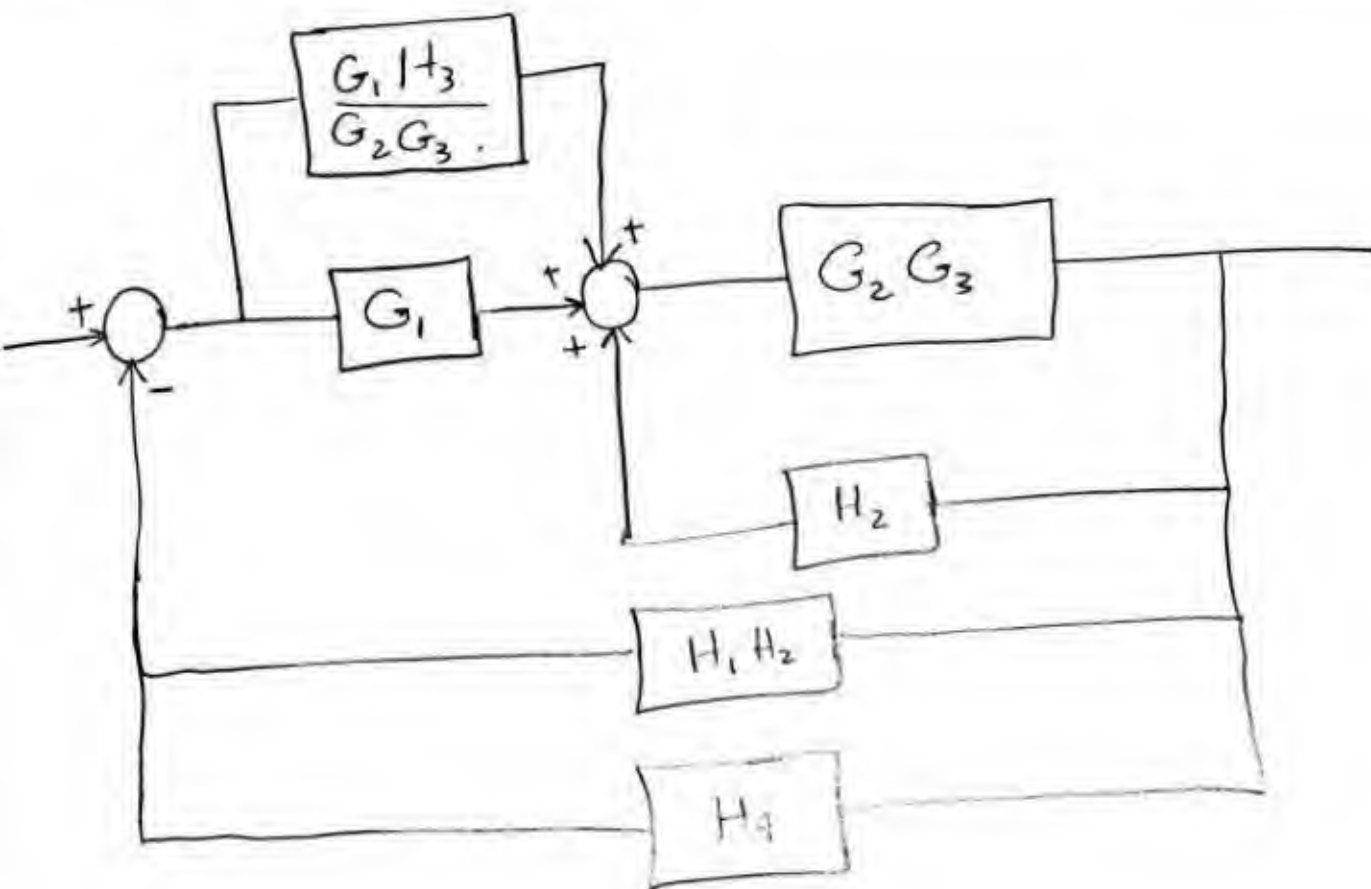
$$RC \frac{dV_o}{dt} + V_o = V_i$$

Laplace At zero initial condition.

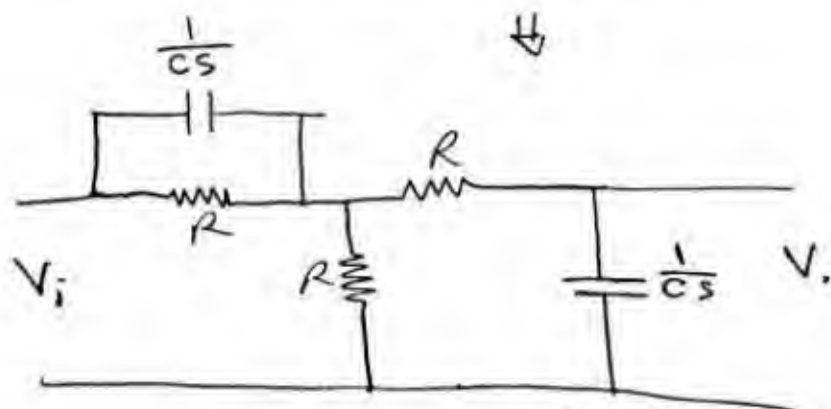
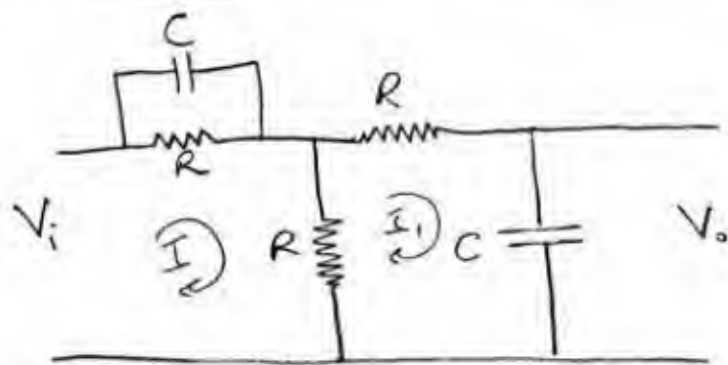
$$RCs V_o + V_o = V_i$$

$$\frac{V_o}{V_i} = \frac{1}{RCs + 1}$$





Continue



Q7

$$V_o = \frac{I_1}{Cs}$$

$$V_i = I Z_{eq}$$

$$I_1 = \frac{R}{2R + \frac{1}{Cs}} I$$

$$\frac{V_o}{V_i} = \frac{\frac{R/Cs}{2R + \frac{1}{Cs}}}{Z_{eq}} = \frac{R}{2RCs + 1} \cdot \frac{1}{Z_{eq}}$$

~~$$Z_{eq} = \frac{R(2RCs+1) + R(RCs+1)^2}{(RCs+1)(2RCs+1)}$$~~

$$T.F = \frac{Z(s)}{P(s)} \quad \begin{array}{l} \rightarrow \text{zeros} \\ \rightarrow \text{poles} \end{array}$$

$$T.F = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2} \rightarrow \text{2nd order}$$

$$K_p = \lim_{s \rightarrow \infty} G(s)$$

$$K_v = \lim_{s \rightarrow 0} s G(s)$$

$$K_a = \lim_{s \rightarrow 0} s^2 G(s)$$